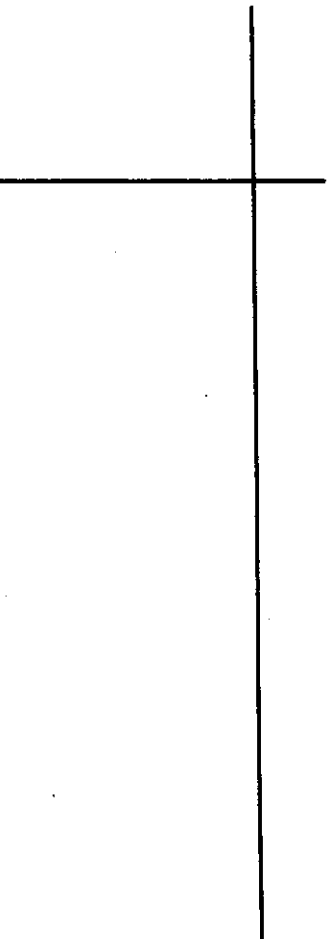


A Few More Examples of Sinusoidal Functions

1. Given $y = -6 \sin \left(\frac{3}{2}x + \frac{\pi}{4} \right) - 4$. State the amplitude, period, phase shift, and vertical shift. Then sketch the graph and label all important points on the axes.

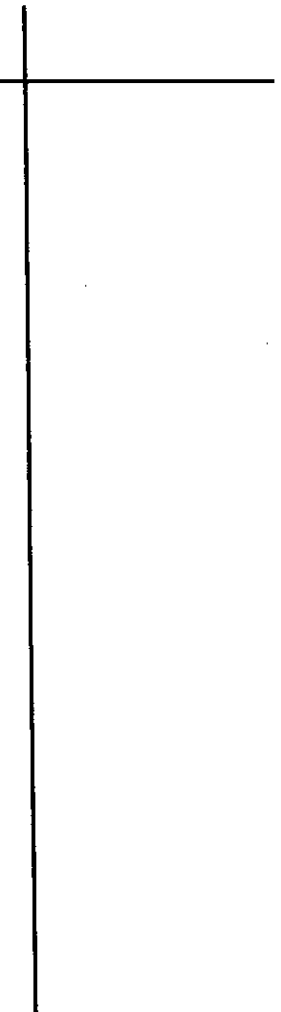
$$y = -6 \sin \left(\frac{3}{2}x + \frac{\pi}{4} \right) - 4 = \underline{\hspace{2cm}}$$

Amplitude: _____ Period: _____ Phase Shift: _____ Vertical Shift: _____



2. The number of hours of sunlight in a day for a given location can be modeled by a sinusoidal function. The longest day of the year (in terms of hours of sunlight) occurs on the day of the summer solstice. The summer solstice is the time when the sun is the farthest north. This year in Tucson, the summer solstice will occur at 10:16 am Tucson time on June 21 (the 172nd day of the year). The shortest day of the year occurs on the day of the winter solstice. The winter solstice is the time when the sun is farthest south. This year in Tucson, the winter solstice will occur at 10:30 pm on December 21 (the 355th day of the year). The number of hours of sunlight in Tucson on the summer solstice will be 14.27 hours and the number of hours of sunlight on the winter solstice will be 10.05 hours.

- a. Draw a graph of the number of hours of sunlight with respect to the days of the year for the year 2011. Label the important points on the two axes.



- b. State the amplitude, period, phase shift, and vertical shift of the function drawn above.

Amplitude: _____ Period: _____ Phase Shift: _____ Vertical Shift: _____

- c. Write the equation of the sinusoidal function. $y =$ _____

- d. According to the equation, how many hours of sunlight will there be in Tucson today, March 9th, which is the 68th day of the year?